Multicenter Report on Dialysis and Transplantation in Korea, 1986

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Since 1981, the Korean Society of Nephrology began annual report on renal replacement therapy in Korea. The annual number of new patients receiving dialysis treatment in 1986 increased to 957 patients (23.3 per million population) from 825 patients (20.4 per million population) in 1985. And the total number of patients on replacement therapy increased from 1,508 patients (37.3 per million population) to 2,534 patients (61.7 per million population). 1,340 patients (32.6 per million population) of these patients were on hemodialysis, 573 patients (13.9 per million population) on continuous ambulatory peritoneal dialysis (CAPD) and 621 patients (15.1 per million population) on functioning renal graft as of December 31, 1986.

The common causes of renal failure of new patients were chronic glomerulonephritis (41.6%) followed by diabetic nephropathy (12.6%), hypertensive nephrosclerosis (7.8%), chronic pyelonephritis (2.5%) and others. The annual mortality rate decreased from 21.9% in 1981 to 13.5 in 1986. The common causes of death in patients on dialysis therapy were cardiac (32.8%), vascular (14.7%), infective (14.7%) and social problems (11.2%) in the order of frequency.

Recently, the number of patients requiring dialysis is rapidly increasing due to expanded medical insurance support for dialysis and improved economic status of our country. Therefore, it is necessary to draw up counterplan for a rapid growth of the number of new patients.

Key Words: Hemodialysis, Peritoneal dialysis, Renal transplantation

INTRODUCTION

In 1964, twin coil artificial kidney had been first introduced in Capital Army Hospital, Seoul, Korea for the treatment of acute renal failure due to hemorrhagic fever with renal syndrome. Until the early 1960's, hemodialysis and peritoneal dialysis therapy were limited to the patients with acute renal failure including hemorrhagic fever with renal syndrome (Kim et al., 1965).

Since 1980's when the medical insurance began

economic support for the dialysis care, the population on replacement therapy including hemodialysis, continuous ambulatory peritoneal dialysis (CAPD), and renal transplantation have grown rapidly such level that 2,534 patients were kept alive with replacement therapy in 1986. Since 1981, when the CAPD had been first introduced in Korea (Lee HB, 1981) for the management of chronic renal failure, the dialysis patients on CAPD increased from 13% in 1981 to 30% in 1986. This progressive rise of the patients on CAPD represents that CAPD is an effective and less expensive form of dialysis than hemodialysis, and also reflects the shortage of hemodialysis equipment. mation about renal replacement therapy, and to draw up counterplan for a rapid growth of new dialysis patients.

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MATERIALS AND METHODS

The subjects of this report were the patients on dialysis therapy and on renal transplantation from January, 1986 to December 31, 1986. This report was based on analysis of the individual patient questionnaires and center questionnaires to 70 hemodialysis centers in Korea. We have obtained these data concerned the incidence, mortality and prevalence in the patient on dialysis therapy and transplantation from 44 active dialysis centers. The patients on short term dialysis due to acute renal renal failure or drug intoxication were excluded in this report. The geographic distribution of hemodialysis centers and the participating hospitals are shown in table 1 & table 2.

Table 1. Distribution of hemodialysis centers

Provinces	No. of HD centers
Seoul	22
Pusan	10
Taegu	5
Inchun	2
Kwangju	4
Kyungki-Do	7
Kangwon-Do	3
Chungchungbuk-Do	1
Chungchungnam-Do	5
Chullabuk-Do	3
Chullanam-Do	1
Kyungsangbuk-Do	3
Kyungsangnam-Do	3
Cheju-Do	1
Total	70

RESULTS

1. Equipments for dialysis

The number of equipments for hemodialysis increased from 223 in 1985 to 324 in 1986. The incremental rate of equipments was about 45%. The number of equipments of hemofiltration and peritoneal dialysis is shown in table 3.

2. The patients on replacement therapy

The number of living dialysis and transplant patients at the end of the each year is shown in Fig 1. Of the total 2,534 patients, 52.9% were on hemodialysis, 22.6% on CAPD and 24.5% on functioning renal graft. The number of patients on hemodialysis increased from 808 patients (20 per million population) in 1985

* No. of patients as of July 31, 1987

Fig. 1. Living dialysis and transplant patients at the end of each Year

Fig. 2. Sex and age distribution of living dialysis patients, 1986.

to 1,335 patients (32.6 per million population) in 1986, and the number of patients on CAPD increased from 370 (9.1 per million population) in 1985 to 573 patients (13.9 per million population) in 1986. Total number of patients on dialysis increased by 62.4% in 1986, compared with 1985 (Bang BK, 1985), and a total of 1,913 patients (46.6 per million population) were living on dialysis treatment as of December 31, 1986.

On July 31, 1988, the number of patients on dialysis markedly increased to 2,844 (67.7 patients per million

Table 2. List of participating hospital

Area	Name of hospital
Seoul	Seoul National University Hospital Yonsei University Severance Hospital Catholic University Medical College, Kangnam St. Mary's Hospital Korea University Hospital Hanyang University Hospital Kyung-Hee University Hospital Soon Chun Hyang University Hospital Chung-Ang University Hospital Ewha Woman's University Hospital Inje Medical College, Paik Hospital Hallym College, Han Gang Sacard Heart Hospital National medical Center Dong-Boo City Hospital Dr. Chung's Dialysis Clinic
Pusan	Pusan National University Hospital Kosin Medical College, Gospel Hospital Inje Medical College, Paik Hospital Pusan Maryknoll Hospital Pusan Wallace Memorial Baptist Hospital
Taegu	Kyungpook National University Hospital Yeong Nam University Hospital Keimyung University Hospital
Inchun	Inchun Christian Hospital
Kwangju	Chunnam National University Hospital Cho-Sun University Hospital Kwangju Christian Hospital
Kyungki-Do	Catholic University Medical College, St. Vincent's Hospital Catholic University Medical College, St. Holy Family Hospital In-Ha University, Sungham In-Ha Hospital Sin-Chun Hospital Anyang Jungang Hospital
Kangwon-Do	Yonsei University, Wonju College of Medicine, Wonju Christian Hospital Kangneung Dong-In Hospital
Chungchongbuk-Do	Chongju Namgung Hospital
Chungchongnam-Do	Chungnam National University Hospital Catholic University Medical College, Daejeon St. Mary's Hospital Daejeon Eulji General Hospital
Chullabuk-Do	Chunbuk National University Hospital Wonkwang University Hospital Presbyterian Medical Center
Kyungsangbuk-Do	Pohang St. Mary's Hospital
Kyungsangnam-Do	Masan Korea Hospital

population) compared to 1,913 in 1986.

The age and sex distribution of living dialysis patients is shown in Fig 2. The age distribution of pa-

tients in 1986 shows a peak in the thirties both on hemodialysis and on CAPD. Males predominated in a ratio of 2 to 1.

3. New dialysis patients.

The annual number of new patients receiving dialysis therapy since 1976 is shown in Fig 3. 957 new patients (23.3 per million population) entered dialysis therapy in 1986 which is 14% increase from 1985. The proportion of patients starting hemodialysis was 70.0% and CAPD was 30.0%. The age and sex distribution of new patients receiving dialysis therapy is shown in Fig. 4.

The age distribution of patients in 1986 shows a peak in the thirties both on hemodialysis and on CAPD. Males predominated in a ratio of 1.9 to 1.0. The primary renal diseases of new patients are shown in table 4. Among the primary diseases, chronic glomerulonephritis was most prevalent with incidence of 41.6% and in the following order of diabetic nephropathy(12.6%), hypertensive nephrosclerosis (7.8%) and chronic pyelonephritis(2.5%). The proportion of patients with diabetic nephropathy increased from 9.7% in 1985 to 12.6% in 1986.

Table 3. Equipments for dialysis

Equipments	1986	1987
Hemodialysis	223	324
Center	219	319
Home	4	5
Hemofiltration	2	22
Peritoneal dialysis	0	2

Table 4. Primary renal diseases of new patients receiving dialysis treatment

Causes	No. of cases (%)	
	1985	1986
Chronic glomerulonephritis	215 (40.0)	347 (41.6)
Histologically not examined		322
Histologically examined		25
Diabetes	52 (9.7)	105 (12.6)
Type I		27
Type II		78
Hypertensive nephrosclerosis	34 (6.3)	65 (7.8)
Pyelo/interstitial nephritis	7 (1.3)	21 (2.5)
Cause not determined		10
Obstructive uropathy		6
Urolithiasis		2
Drug induced		2
Others		1
Renal tuberculosis	8 (1.5)	11 (1.3)
Polycystic kidney	10 (1.9)	10 (1.2)
Lupus nephritis	2 (0.4)	6 (0.7)
Trauma	0 (0.0)	2 (0.2)
Alport's syndrome	2 (0.4)	1 (0.1)
Myeloma kidney	3 (0.7)	1 (0.1)
Gout nephropathy	1 (0.2)	1 (0.1)
Others	8 (1.5)	3 (0.4)
Uncertain	195 (36.3)	261 (31.2)
Total	537 (100.0)	834 (100.0)

41.6% and in the following order of diabetic nephropathy(12.6%), hypertensive nephrosclerosis (7.8%) and chronic pyelonephritis(2.5%). The proportion of patients with diabetic nephropathy increased from 9.7% in 1985 to 12.6% in 1986.

4. Causes of death in patients on dialysis therapy

The number and cause of death during the year are shown in Table 5. Total 116 deaths were reported in the patients on dialysis therapy in 1986. The cardiovascular disease including myocardial infarction, pericarditis, hypertensive heart failure and cerebrovascular accident was the most common cause of death which accounted for 47.5% of 116 deaths. The social causes of death including suicide and withdrawal or refusal of further treatment because of financial or other social problems markedly decreased from 21% in 1985 to 11% 1986.

5. Prevalence of dialysis associated hepatitis

The prevalence of hepatitis B in dialysis patients was 2.1% (40 cases) and non-A, non-B hepatitis was 0.5% (10 cases).

Table 5. Causes of death

Causes	No. of cases(%)	
	Dialysis	Transplant
Cardiac	38 (32.8)	1
Myocardial infarction	5	
Hyperkalemia	5	
Hemorrhagic	1	
Cardiac arrest, unknown	15	1
Hypertensive heart failure	6	
others	6	
Vascular	17 (14.7)	
Cerebrovascular accident	15	
Ruptured vascular aneurysm	2	
Infection	17 (14.7)	1
Pulmonary (bacterial)	3	
Septicemia	9	1
Pulmonary tuberculosis	2	
Tuberculosis, others	1	
Peritonitis	2	
Liver disease	1 (0.9)	
Hepatitis B	1	
Social	13 (11.2)	
Refuse further treatment	6	
Treatment ceased, other reason	7	
Miscellaneous	7 (6.0)	
Cachexia	2	
Malignant disease	1	
Unknown	4	
Accident	6 (5.1)	
Accident related treatment	2	
Accident unrelated treatment	2	
Others	2	
Cause of death uncertain/not determined	17 (14.7)	
Total	116(100.0)	2

Table 6. Transplant information

Information	No. of cases	
	1985	1986
Total No. of transplant in all year	586	891
Functioning graft at the end of year	330	621
No. of transplant at the year	140	221
First graft	140	221
Patients aged less than 15 years	3	5
Living donor	136	216
Cadaver donor	4	5
Donor specific transfusion	60	109
Transplant in diabetes	4	8
Live birth with functioning graft	0	1
Not transplant due to cytotoxic Ab.	10	5

Fig. 3. Annual intake of new patients

Fig. 4. Sex and age distribution of new patients, 1986

6. Renal transplantation

Total of 891 renal transplantations has been performed since 1969 in Korea. Of these patients, 621 patients survived with functioning renal graft. In 1986, 221 renal allograft were performed, and of these, 216 patients received the kidney from living donor, 5 patients from cadaver donor (table 6). the causes of death in renal transplant recipients in 1986 are shown in Table 5.

DISCUSSION

In 1981, The Korean Society of Nephrology decided to report annually on the status of dialysis therapy and transplantation in Korea. Since 1980, The number of patients on replacement therapy has grown rapidly due to expanded medical insurance support for dialysis care and improved general economic status. Total of 957 new patients received dialysis therapy and 221 renal transplantation in 1986. The annual number of new dialysis patients per million population rose from 9.1 to 23.3 over 1981-1986 (Fig 3). The number of dialysis patients in 1986 was 1,913 which is an increase of 34.8% from 1985. The number of patients on functioning renal allograft in 1986 was 621 patients and increased by 46.8% compared with 1985. By the end of 1986, total of 2,534 patients (61.7 patients per million population) were on replacement therapy. 52.7% of these were living on hemodialysis, 22.6% on CAPD, 24.5% on functioning renal graft and only 0.2% on home hemodialysis.

The number of hemodialysis equipments was increased by 45% compared with 1985 but it could not overcome the annual growth rate of dialysis population. Thereby the proportion of the patients on CAPD rose from 17% to 30% over 1981-1986.

Total 116 deaths were reported in the patients with dialysis therapy in 1986. The largest proportion of death on dialysis therapy was caused by cardiovascular complications (47.5%), which included myocardial infarction, other causes of cardiac failure, pericarditis, and cerebrovascular accident. Death from social problems including suicide, withdrawal or refusal of further dialysis treatment due to financial problems or other reasons markedly decreased from 21% in 1985 to 11% in 1986.

Since 1969, when the first renal transplantation had been performed successfully in Korea (Lee YK et al., 1969), total 891 patients underwent renal transplantation until December 31, 1986 and 621 patients of these were living on functioning renal allograft as of the end of 1986. Most of donors were living relatives, and the cadaver kidneys were used only in 1-2% of total cases because of ethical and legal problems concerning brain death and traditional customs of our country.

The prevalence of renal replacement therapy in Korea was 61.7 patients per million population. But this rate was still low in Korea compared with 200 patients per million in Sweden (Erlanson P, 1985), 490

patients per million in United States (California dial. council, 1988) and 550 patients per million in Japan (Abe H, 1987). However it can be easily estimated that the dialysis population will be soon reached to the level of other developed countries because of a rapid growth of new patients, gradual fall of annual mortality and improved economic and social status. Therefore, it is necessary to draw up counterplan for a rapid growth of the number of patients on renal replacement therapy.

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